

What is claimed is:

1. An image forming method comprising the steps of:  
developing an electrostatic latent image on an image forming body employing a developing agent composed of flattened spheroidal toner particles to form a toner image;

transferring the toner image formed on the image forming body onto a transfer material; and

fixing the toner image on the transfer material by a fixing device,

wherein the flattened spheroidal toner particles satisfy the following conditions:

$r_2/r_1$  is not less than 0.6 and not more than 1.0;

$d/r_2$  is not less than 0.1 and not more than 0.5;

$r_2$  is not less than 5  $\mu\text{m}$  and not more than 20  $\mu\text{m}$ ; and

$r_1$  is not less than 5  $\mu\text{m}$  and not more than 20  $\mu\text{m}$ ,

wherein  $r_1$  represents an average length of a major axis of each of the flattened toner particles,  $r_2$  represents an average length of a minor axis of each of the flattened toner particles, and  $d$  represents an average thickness of each of the flattened toner particles.

2. The image forming method of claim 1, wherein the following conditions are satisfied:

$r_2/r_1$  is not less than 0.8 and not more than 1.0;

$d/r_2$  is not less than 0.2 and not more than 0.4; and

$d$  is not less than 1  $\mu\text{m}$  and not more than 5  $\mu\text{m}$ .

3. The image forming method of claim 1, wherein the developing agent is a two-component developing agent composed of the flattened toner particles and carrier particles, each of the flattened toner particles is attached onto the image forming body or the transfer material in such a manner that a surface perpendicular to a direction of the thickness of each of the flattened toner particles comes into contact with a surface of the image forming body or a surface of the transfer material.

4. The image forming method of claim 3, wherein an electric charge is applied to the flattened toner particles by a frictional charging with the carrier particles, each of the flattened toner particles is attached onto each of the carrier particles, and said developing step is conducted in condition where a surface coverage ratio by a sectional area of a portion perpendicular to the direction of the thickness

of each of the flattened toner particles to a surface area of each of the carrier particles is 40 to 80%.

5. The image forming method of claim 3, wherein an adhesion or a movement of the flattened toner particles in said developing or transferring step is conducted while the surface perpendicular to the direction of the thickness of each of the flattened toner particles faces the surface of the image forming body or the surface of the transfer material.

6. The image forming method of claim 1, wherein the developing agent is a two-component developing agent composed of the flattened toner particles and carrier particles, said developing step is conducted in condition where the flattened toner particles are attached to latent image portions on the image forming body and where external additives are attached to each of the flattened toner particles, a condition of  $|Q'| > |Q|$  is satisfied wherein  $Q'$  ( $\mu\text{C/g}$ ) represents a charge quantity of the flattened toner particles with the external additives attached thereto and  $Q$  ( $\mu\text{C/g}$ ) represents a charge quantity of the flattened toner

particles without the external additives attached thereto, and a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to a surface of the image forming body.

7. The image forming method of claim 6, wherein  $|Q'|/|Q|$  is not less than 1.1 and not more than 1.5.

8. The image forming method of claim 6, wherein said developing step is conducted in such a manner that the surface covering ratio by the sectional area of the portion perpendicular to the direction of the thickness of each of the flattened toner particles to the superficial area of each of the carrier particles is 50 to 100%.

9. The image forming method of claim 1, wherein the developing agent is a two-component developing agent composed of the flattened toner particles and carrier particles, said developing step is conducted in condition where the flattened toner particles are attached to latent image portions on the image forming body and where a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to a surface of the image forming body

while external additives are attached to each of the flattened toner particles, and the following condition is satisfied,

$p/r$  is not more than  $10^{-1}$  and not less than  $5 \times 10^{-3}$ , wherein  $p$  represents a diameter of each of the particles of the external additives,  $r$  represents a diameter of each of the flattened toner particles.

10. The image forming method of claim 9, wherein  $p/d$  is not more than  $3 \times 10^{-1}$  and not less than  $3 \times 10^{-2}$ , wherein  $d$  represents a thickness of each of the flattened toner particles.

11. The image forming method of claim 9, wherein an annexing amount of the external additives attached to the flattened toner particles is 0.1 to 5.0% by

↑  
attaching

image forming method of claim 9, wherein second external additives each having a diameter larger than each of said external additives are used with said external additives.

13. The image forming method of claim 1, wherein the developing agent is a two-component developing agent composed of the flattened toner particles and carrier particles, said developing step is conducted in condition where a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to latent image portions on the image forming body, the flattened toner particles are prepared by flattening-processing of spherical polymerization toner particles, and in a particle size distribution of the spherical polymerization toner particles for use in preparing the flattened toner particles, more than 80% of the spherical polymerization toner particles satisfy the following expression,

$$1/2 < d_0/d_0 (M) < 2$$

wherein  $d_0$  represents a diameter of each of the spherical toner particles, and  $d_0 (M)$  represents an average particle diameter of the spherical toner particles.

14. The image forming method of claim 13, wherein more than 95% of the spherical polymerization toner particles satisfy the following expression,

$$1/2 < d_0/d_0 (M) < 2.$$

15. The image forming method of claim 1, wherein the developing agent is a two-component developing agent composed of the flattened toner particles and carrier particles, said developing step is conducted in condition where a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to latent image portions on the image forming body, and in a ratio distribution of a thickness  $d$  to a diameter  $r$  of each of the flattened toner particles, more than 80% of the flattened toner particles satisfy the following expression,

$$1/2 < (d/r)/(d/r) (M) < 2,$$

wherein  $(d/r) (M)$  represents an average ratio of the thickness  $d$  to the diameter  $r$  of the flattened toner particles.

16. The image forming method of claim 15, wherein more than 95% of the flattened toner particles satisfy the following expression,

$$1/2 < (d/r)/(d/r) (M) < 2.$$

17. The image forming method of claim 1, wherein the developing agent is a single-component developing agent composed of the flattened toner particles, each of the

flattened toner particles is attached onto the image forming body or the transfer material in such a manner that a surface perpendicular to a direction of the thickness of each of the flattened toner particles comes into contact with a surface of the image forming body or a surface of the transfer material.

18. The image forming method of claim 17, wherein an electric charge is applied to the flattened toner particles by a frictional charging between a developing sleeve and a pressing member in a developing device, each of the flattened toner particles is attached onto the developing sleeve in condition where the surface perpendicular to the direction of the thickness of each of the flattened toner particles comes into contact with a surface of the developing sleeve, and said developing step is conducted in such a manner that a surface coverage ratio by a sectional area of a portion perpendicular to the direction of the thickness of each of the flattened toner particles to a surface area of the developing sleeve is 60 to 12%.

19. The image forming method of claim 17, wherein an adhesion or a movement of the flattened toner particles in



said developing or transferring step is conducted while the surface perpendicular to the direction of the thickness of each of the flattened toner particles faces the surface of the image forming body or the surface of the transfer material.

20. The image forming method of claim 1, wherein the developing agent is a single-component developing agent composed of the flattened toner particles, said developing step is conducted in condition where the flattened toner particles are attached to latent image portions on the image forming body and where external additives are attached to each of the flattened toner particles, a condition of  $|Q'| > |Q|$  is satisfied wherein  $Q'$  ( $\mu\text{C/g}$ ) represents a charging amount of the flattened toner particles with the external additives attached thereto and  $Q$  ( $\mu\text{C/g}$ ) represents a charging amount of the flattened toner particles without the external additives attached thereto, and a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to a surface of the image forming body.

21. The image forming method of claim 20, wherein  $|Q'|/|Q|$  is not less than 1.1 and not more than 1.5.

22. The image forming method of claim 22, wherein said developing step is conducted in such a manner that the surface coverage ratio by the sectional area of the portion perpendicular to the direction of the thickness of each of the flattened toner particles to the superficial area of each of the carrier particles is 50 to 100%.

23. The image forming method of claim 1, wherein the developing agent is a single-component developing agent composed of the flattened toner particles, said developing step is conducted in condition where the flattened toner particles are attached to latent image portions on the image forming body and where a surface perpendicular to a direction of the thickness of each of the flattened toner particles is attached to a surface of the image forming body while external additives are attached to each of the flattened toner particles, and the following condition is satisfied,  
 $p/r$  is not more than  $10^{-1}$  and not less than  $5 \times 10^{-3}$ ,

wherein  $p$  represents a diameter of each of the particles of the external additives,  $r$  represents a diameter of each of the flattened toner particles.

24. The image forming method of claim 23, wherein  $p/d$  is not more than  $3 \times 10^{-1}$  and not less than  $3 \times 10^{-2}$ , wherein  $d$  represents a thickness of each of the flattened toner particles.

25. The image forming method of claim 23, wherein an annexing amount of the external additives attached to the surface of the flattened toner particles is 0.1 to 5.0% by weight.

26. The image forming method of claim 23, wherein second external additives each having a diameter larger than each of said external additives are used with said external additives.

27. The image forming method of claim 1, wherein the developing agent is a single-component developing agent composed of the flattened toner particles, said developing step is conducted in condition where a surface perpendicular

to a direction of the thickness of each of the flattened toner particles is attached to latent image portions on the image forming body, the flattened toner particles are prepared by flattening-processing of spherical polymerization toner particles, and in a particle size distribution of the spherical polymerization toner particles for use in preparing the flattened toner particles, more than 80% of the spherical polymerization toner particles satisfy the following expression,

$$1/2 < d_0/d_0(M) < 2$$

wherein  $d_0$  represents a diameter of each of the spherical toner particles, and  $d_0(M)$  represents an average particle diameter of the spherical toner particles.

28. The image forming method of claim 27, wherein more than 95% of the spherical polymerization toner particles satisfy the following expression,

$$1/2 < d_0/d_0(M) < 2.$$

29. The image forming method of claim 1, wherein the developing agent is a single-component developing agent composed of the flattened toner particles, said developing step is conducted in condition where a surface perpendicular

to a direction of the thickness of each of the flattened toner particles is attached to latent image portions on the image forming body, and in a ratio distribution of a thickness  $d$  to a diameter  $r$  of each of the flattened toner particles, more than 80% of the flattened toner particles satisfy the following expression,

$$1/2 < (d/r)/(d/r) (M) < 2,$$

wherein  $(d/r) (M)$  represents an average ratio of the thickness  $d$  to the diameter  $r$  of the flattened toner particles.

30. The image forming method of claim 29, wherein more than 95% of the flattened toner particles satisfy the following expression,

$$1/2 < (d/r)/(d/r) (M) < 2.$$

31. The image forming method of claim 1, wherein said fixing step comprises:

forming an electric field in the fixing device in such a manner that a surface perpendicular to a direction of the thickness of each of the flattened toner particles comes into contact with a surface of the transfer material; and

fixing the flattened toner particles attached to the transfer material thereon while applying pressure to the transfer material.

32. The image forming method of claim 1,  
wherein said developing step comprises repeating of the developing of the latent image to form toner images,  
the image forming method further comprising the step of superimposing the toner images on the image forming body to form a color toner image,  
said transferring step comprises transferring collectively the color toner image formed on the image forming body onto the transfer material, and  
said fixing step comprises  
forming an electric field in the fixing device in such a manner that a surface perpendicular to a direction of the thickness of each of the flattened toner particles comes into contact with a surface of the transfer material to attach thereto; and  
fixing the superimposed flattened toner particles attached to the transfer material thereon while applying pressure to the transfer material.

33. The image forming method of claim 1,

wherein said developing step comprises developing each of latent images formed on respective image forming bodies of plural image forming units which are arranged on an intermediate transfer body to form toner images, in which different colored toners are contained in each unit,

said transferring step comprises transferring and superimposing successively the toner images formed on the respective image forming bodies onto the intermediate transfer body to form a color image, and then transferring collectively the color toner image onto the transfer material, and

said fixing step comprises:

forming an electric field in the fixing device in such a manner that a surface perpendicular to a direction of the thickness of each of the flattened toner particles comes into contact with a surface of the transfer material to attach thereto; and

fixing the superimposed flattened toner particles attached to the transfer material thereon while applying pressure to the transfer material.